Zero Retries Beacon Edition 0092 2023-03-31

Zero Retries is an independent newsletter about technological innovation in Amateur Radio. Zero Retries promotes Amateur Radio as (literally) a license to experiment with radio technology.

About Zero Retries

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About the BEACON Edition

See the explanation about the BEACON Edition in Zero Retries 0091.

Good AREDN Documents Available on Facebook

If you're interested in Amateur Radio Emergency Data Network (AREDN) microwave networking, *and* you're on Facebook, I recommend joining the Facebook group **AREDN**. AREDN Ambassador Orb Beach W6BI posts useful information, and documents in that Facebook group… and nowhere else[1] (not the AREDN website [though older versions of documents are available there], nor on the AREDN mailing list. The most recent good documents posted by W6BI on the Facebook AREDN group are:

- **801.11n_Replacements-V1.1.pdf**
- **AREDN_Beginners_Guide-v21.pdf**
- **LQM.pdf**

The first two documents are self-explanatory; the third document is an explanation of *Link Quality Management*. All of these are recommended reading for AREDN users.

Because they're posted on Facebook, I can't offer links to those documents.

W6BI's intro to the first document:

> [This is] a doc that shows some 802.11ac devices that are appropriate for new installs, or upgrades of existing equipment. While the software for them is still in the nightly builds, the software is stable and they'll be included in the next production release, which should be soon.
>
> All 802.11ac devices:
>
> - Have Gigabit Ethernet ports, two in some cases, and five for the Mikrotik hAP ac2 & ac3
> - Have faster CPUs
> - Have more RAM
> - Most have more flash memory
> - Appear to have more sensitive receivers
> - Report true noise level
>
> Those of us who have tested 802.11ac devices in production environments are very happy with the improvement in performance. YMMV of course, but I've found with very good link qualities, throughput (as measured with iperf3) can be close to double when both ends have been upgraded.
>
> They report true noise level, rather than the 'fake' -95 dB every 802.11n device shows, regardless of true noise level. Again YMMV but typically I've found the typical noise level to be 5-6 dB better (lower) than -95. While signal strengths don't improve, the lower noise level makes every SNR better 🙂

> The faster CPU allows for faster web page updates (assuming the network throughput allows it).
>
> Bottom line - don't buy any more 802.11n devices.

Update - The document *802.11n_Replacements-v1.1.pdf* is now available online.

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UDARP - Universal Digital Radio Protocol

- Any form of data over HF
- Designed for QRP [low power]
- Any RIGCTL transceiver
- BBS/SMS /Email/HB and more!
- GPL3 Open Source

> With ongoing development and testing, this project is expected to make it easier to send data in any form over slow and unreliable communication networks.
>
> This project is currently in its early stages but has the potential to revolutionize the way we interact and exchange data.

Github page:

> … written in Golang
>
> UDARP is an advanced digital radio protocol that enables reliable HF communication in noisy environments. It flexibility offers a wide range of features, including messaging, control, BBS, SMS, email, and beacons, and is designed to work with low power transmitters. Whether you need to establish communication in remote areas or transmit data over long distances, UDARP provides a powerful and efficient solution.

I wish that the author(s)(?) offered more background on UDARP, but at minimum it sounds like an interesting project.

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NinoTNC Firmware Version 3/4.21 Released

Nino Carrillo KK4HEJ on the NinoTNC mailing list:

This firmware version makes big improvements in GFSK receive sensitivity. This is due to improvements in digital filtering, and improvements to the clock recovery algorithm. AFSK receive performance is the same as version .17 (which was already quite good), but now consumes less processor time. I've removed the experimental SSB modes that incorporated convolutional encoding and interleaving. They're just not ready for prime-time yet. But traditional 300 and 150 baud modes are supported in AX.25 and IL2P. These modes have also benefitted from improved digital filtering and clock recovery.

The progress of the capabilities of the NinoTNC continues to amaze me.

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Teensy RPR TNC

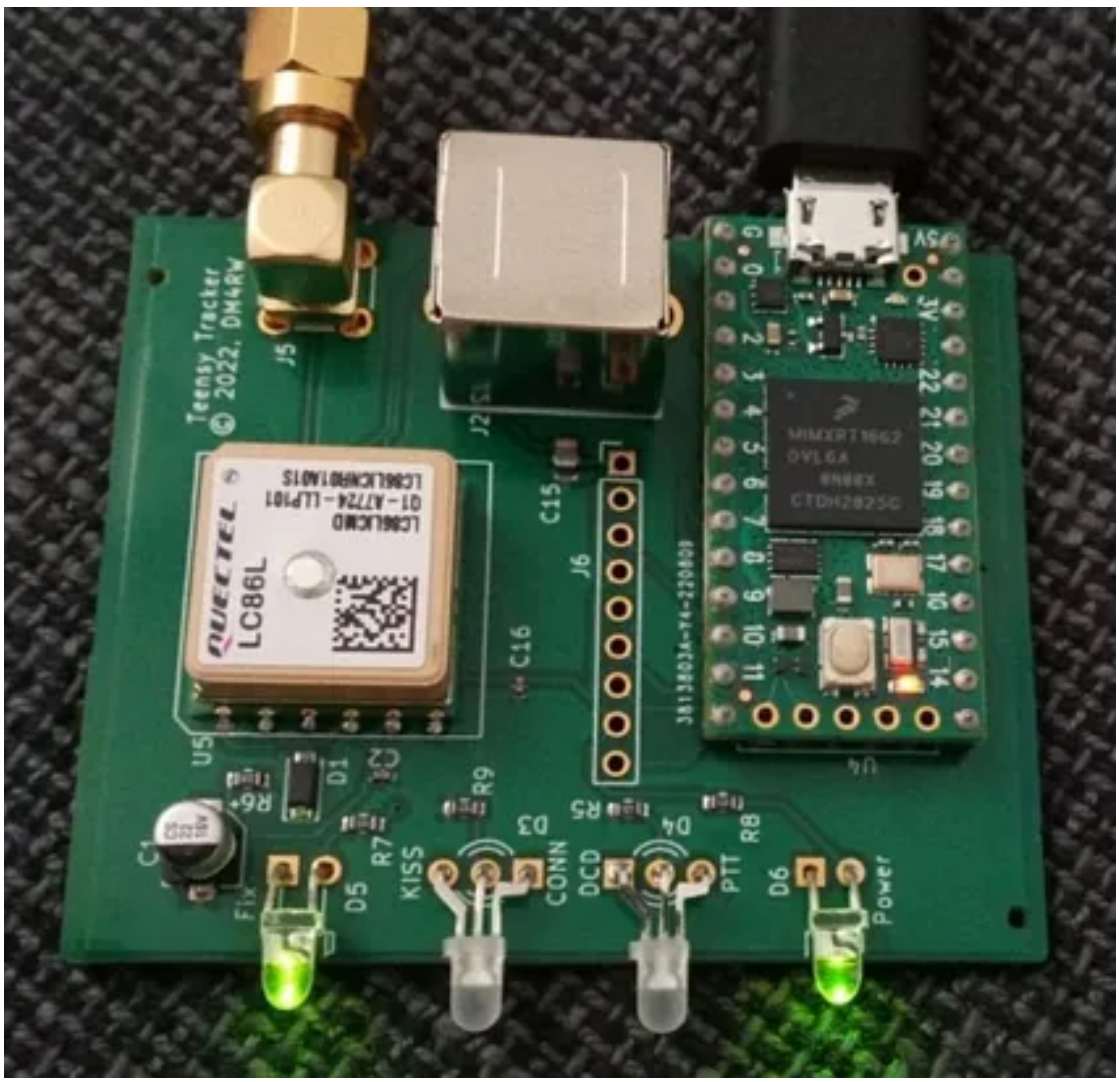

Image courtesy of Teensy RPR TNC project

Teensy is a powerful microcontroller board; RPR - Robust Packet Radio; TNC - Terminal Node

Controller.

The Teensy RPR TNC is an independent project to provide hardware to run software by SCS that implements the RPR mode.

> The **Teensy RPR TNC** follows the former SCS Tracker after that had its end of production in 2020 due to spare parts no longer available on the market.
>
> The **Teensy RPR TNC** is not a commercial product but a hamradio project not aiming for any profit. However, the software is still developed by SCS personnel.

Why do this hard work to replicate a discontinued commercial product to run a proprietary data mode?

Background on Robust Packet Radio from Signal Identification Wiki:

> **Robust PACKET [Radio]**, also known as HF-APRS, RPR, Winlink RMS, APRSlink, RPR-HF-APRS, and SCS Robust Packet, is an OFDM version of the amateur mode PACKET optimized for shortwave use. This mode was developed by Spezielle Communications Systeme GmbH & Co. KG (SCS), who developed the PACTOR protocol.
>
> Robust PACKET uses 500 Hz of bandwidth with 60 Hz spacing between carriers, and uses OFDM with 8 DBPSK or DQPSK carriers. On 200 bps mode, it uses BPSK. For 600 bps mode, DQPSK is used. For both modes, each subcarrier runs at a constant rate of 50 Bd.
>
> Like PACKET, Robust PACKET uses the AX-25 frame protocol for transmitting data. Compared to PACKET, Robust PACKET has better resistance against multipath propagation and fading. In addition, Robust PACKET takes less total bandwidth, with sidebands only extending out to 500 Hz, where with PACKET, the sidebands produced from the 300 BdFSK extend as far as 730 Hz.

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Tigertronics Microphone Adapters

Image courtesy of Tigertronics

These aren't new, but to date I have overlooked them. When I would go to the Tigertronics website, I went straight to the info about the SignaLink USB.

When you want to connect a Terminal Node Controller (TNC) or audio interface to a radio that doesn't have a dedicated data connection, the TNC or audio interface must be connected to the microphone connector and external speaker connector. Installing these units allow easy switching between microphone and TNC / audio interface *and* switching the speaker connector between an external speaker and TNC / audio interface.

- RJ11 / RJ12 Microphone Switch (RJ-11 has 4 pins, RJ12 has 6 pins.)
- RJ45 Microphone Switch (RJ45 has 8 pins - same as Ethernet.)

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Great Scott Gadgets - HackRF One Availability Update

The HackRF One was one of the first "consumer" general purpose Software Defined Transceivers (as in not optimized as a radio for High Frequency (HF) bands, etc.). It's been in production for years now and is very popular with Radio Frequency (RF) hackers.

> In December of 2022, we published a post about the HackRF One shortage and the hardware revision our engineering team completed so that we could continue manufacturing HackRF One. This hardware revision was necessary because we had difficulty sourcing critical components during the global chip shortage, mainly MAX2837- the RF transceiver IC used in every revision of HackRF One before r9. At the time of that post, we had a significant backlog of orders, and we were uncertain about how long production would take with COVID-19 slowing down operations at the factory in China. Today, we have good news: production of r9 went very smoothly, and the finished HackRF Ones started shipping to our warehouses in late February. As of now, all of the backorders for HackRF One have shipped to our resellers.

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ka9q.net Web Page is Back!

ka9q.net was offline for a while, but it's now back online.

Phil Karn KA9Q's web page has been an Amateur Radio touchstone of mine for a very long time, specifically the sub-page The KA9Q NOS TCP/IP Package. NOS (and before it, NET) changed Amateur Radio profoundly for me, and the "WETNET Mafia" in the Seattle area. We ran TCP/IP on AX.25 over our network of 9600 bps repeaters. Now TCP/IP is embedded in *everything*, including now-mundane Wi-Fi controlled light bulbs. But back when KA9Q created NOS, TCP/IP was new and exotic technology. I'm profoundly grateful to KA9Q for the creation of NOS as a gift to Amateur Radio and his innovative (at the time) open source model

of “here’s the source code, do whatever you want with it”.

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[Digital Military Telephone Switch (RP2040) (DNVT)]

Is your TA-1042 military phone collecting dust or sorely missing its ability to dial other phones? Well you're in luck! This nifty little device can interface with 4 DNVT terminals and provide a Line Simulator mode or interface them with your computer over a custom USB protocol. All code and hardware are open source. The product page here has links to all relevant resources.

This is an entirely open source project, hardware by Rob Ruark and software by Nick Andre. Featured in this YouTube video, the first of a series covering this project.

Rob has an excellent writeup on his website here as well.

The IEEE paper that enabled the reverse engineering is here.

While this project and product doesn’t seem to have much to do with Amateur Radio, I saw this product being demonstrated at the recent Mike & Key Electronic Flea Market (Hamfest) in the

Seattle area. At least one of the creators is an Amateur Radio Operator. Until I saw this project, I hadn't given much thought about the evolution of military field telephones from the analog units used in World War II to present, *but of course* such units evolved to using digital technology. So now if you acquire more than one TA-1042, you can get them connected to amuse your friends and family.

Update 1 - From Hackaday - Cold War Military Telephones Now Usable Thanks to DIY Switch Build.

Update 2 - I signed their "log" at the hamfest and received an update email which said in part:

> We are working on a POTS version to use with regular phones and TA-312s etc.. Our plan is to integrate a radio interface into the analog version to enable bridging of field phones with radio equipment.

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Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out **Join the Fun on Amateur Radio** for some pointers.

Zero Retries Frequently Asked Questions (FAQs) - In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- **Pseudostaffers** Dan Romanchik KB6NU and Jeff Davis KE9V for continuing to spot, and write about "Zero Retries Interesting" items on their blogs that I don't spot on my own.
- **Newsletters** that regularly feature Zero Retries Interesting content:
    - Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.
    - Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail)

Experimental (Part 5) licenses issued by the US FCC.

- **YouTube channels** that regularly feature Zero Retries Interesting content:
    - HB9BLA Wireless by Andreas Spiess HB9BLA
    - KM6LYW Radio by Craig Lamparter KM6LY emphasizes Amateur Radio data communications such as the DigiPi project.
    - Tech Minds by Matthew Miller M0DQW is subtitled Ham Radio - SDR - RF Projects - Software - Tutorials.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ~~100~~ ~~200~~ ~~300~~ ~~400~~ *500* ~~600~~ *700+* other readers:

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If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Zero Retries (N8GNJ) is on Mastodon - n8gnj@mastodon.radio - just click:

Zero Retries / N8GNJ on Mastodon

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham (The City of Subdued Excitement), Washington, USA.

2023-03-31

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1

AREDN and W6BI are not, *by far*, the only individual or organization that "silo" good information such as this in an online venue that is only accessible to Facebook users rather than accessible on the open web. One very serious downside to doing so is that "silo'ed" information not on the open web cannot be backed up by the Internet Archive's Wayback Machine.